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NEW DATA ON THE NOMINATIVE SUBGENUS OF THE GENUS *MACROSIPHONIELLA* DEL GUERCIO, 1911 (HEMIPTERA: APHIDIDAE) FROM PALAEARCTIC

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Summary. Two new taxa of aphids from genus *Macrosiphoniella* Del Guercio, 1911 (Hemiptera: Aphididae, Macrosiphini) are described from Kazakhstan. *M.* (s. str.) *aizhanae* Kadyrbekov **sp. n.** from South Kazakhstan region (West Tien Shan) collected on *Pseudolinosyris grimmii*. This new species is most similar to *M. tapuskae* (Hottes et Frison, 1931) in the depth of the frontal groove and the large size of the body but differs from latter by shorter siphunculi ratio to the body length, by cauda length, by the proportion of the processus terminalis to the base of the 6th antennal segment. *M.* (s. str.) *scopariae deserticola* Kadyrbekov, **subsp. n.** from sandy deserts of South Kazakhstan inhabits *Artemisia (Oligosporus)* spp. The new subspecies is basically similar to the *M. scopariae scopariae* Bozhko, 1959, but differs from nominative subspecies by the absence of antesiphuncular and other sclerites on the abdomen in all seasonal morphs, lighter coloring of the head, antennae and legs in apterous viviparous females. New synonymy is proposed: *Macrosiphoniella altaica* Ivanovskaja, 1971 = *M. longirostrata* Holman et Szelegiewicz, 1974, **syn. n.**; *Macrosiphoniella aktashica aktashica* (Nevsky, 1928) = *M. aktashica hirsuta* (Danijarova, 1979), **syn. n.** *Macrosiphoniella khinganica* Pashtshenko, 1998, **stat. n.** is considered as distinct species. A key to light colored Palearctic species of the subgenus *Macrosiphoniella* that lack dark sclerites on the abdomen is also provided.

Key words: aphids, Aphididae, Macrosiphini, *Macrosiphoniella*, taxonomy, new taxa, new synonymy, key.

Р. Х. Кадырбеков. Новые данные по номинативному подроду рода *Macrosiphoniella* Del Guercio, 1911 (Hemiptera: Aphididae) из Палеарктики // Дальневосточный энтомолог. 2019. N 338. С. 1-15.

Резюме. С территории Казахстана описаны два новых таксона рода *Macrosiphoniella* Del Guercio, 1911 (Hemiptera: Aphididae, Macrosiphini). *M.* (s. str.) *aizhanae* Kadyrbekov, **sp. n.** живет на *Pseudolinosyris grimii* в Южно-Казахстанской области (Западный Тянь-Шань). Новый вид по глубине лобного желобка и размеру тела близок к *M. tapuskae* (Hottes et Frison, 1931) и отличается от него соотношением длины трубочек к длине тела, длине хвостика, также пропорцией шпигца к основанию 6-го членика усиков. *M. scopariae deserticola* Kadyrbekov, **subsp. n.** живет на полынях подрода *Oligosporus* в песчаных пустынях Южного Казахстана. Новый подвид в основном сходен с номинативным, но отличается от *M. scopariae scopariae* Bozhko, 1959 отсутствием предтрубочных и других склеритов на брюшке у всех сезонных морф, более светло окрашенными головой, усиками и конечностями у бескрылых живородящих самок, более низкой пропорцией трубочек к телу и большим количеством волосков на хвостике. Установлена новая синонимия: *Macrosiphoniella altaica* Ivanovskaja, 1971 = *M. longirostrata* Holman et Szelegiewicz, 1974, **syn. n.**; *Macrosiphoniella aktashica aktashica* (Nevsky, 1928) = *M. aktashica hirsuta* (Danijarova, 1979), **syn. n.** Статус *Macrosiphoniella khanganaica* Pashtshenko, 1998, **stat. n.** повышен до видового ранга. Составлена определительная таблица для светло-зеленых и зеленых палеарктических видов подрода *Macrosiphoniella*, у которых отсутствуют предтрубочные и другие склериты на брюшке.

INTRODUCTION

Macrosiphoniella Del Guercio, 1911 is a large Holarctic genus of aphids with 150 species and subspecies in the world fauna, most of which inhabit the Palaearctic region (Favret, 2018). Known species are trophically associated with plants of the Compositae (Asteraceae) from the subtribes Antemideae and Artemiseae; some species inhabit plants of the subtribe Cynareae, and others (Polyakov, 1967). They live on aboveground parts of plants, oligophagous, narrow oligophagous and monophagous.

When processing materials collected in recent years in various regions of Kazakhstan, two new taxa have been discovered, described below. Holotypes and paratypes of new taxa are stored in the collection of the Institute of Zoology of the Committee of Science of the Ministry of Education and Science of the Republic of Kazakhstan (Almaty). All measurements in the text are in millimeters.

For compiling a key to species for light colored Palaearctic species of a nominative subgenus that lack dark sclerites on the abdomen, the key to European (Hille Ris

Lambers, 1956; Heie, 1995) and Far Eastern species (Miyazaki, 1971; Pashtshenko, 1998) as well as the primary descriptions of species (Nevsky, 1929; Bozhko, 1953; Hille Ris Lambers, 1956; Narzikulov, 1958; Szelegiewicz, 1963; Umarov, 1964, 1966; Verma, 1971; Ivanovskaja, 1971; Holman & Szelegiewicz, 1974; Basu & Raychaudhuri, 1976; Szelegiewicz, 1978, 1980; Zhang & Zhong, 1980; Pashtshenko, 1998; Zhang *et al.*, 1999; Kadyrbekov, 2000; Kadyrbekov *et al.*, 2002; Kadyrbekov, 2015) were used.

TAXONOMY

Macrosiphoniella (s.str.) *aizhanae* Kadyrbekov, sp. n.

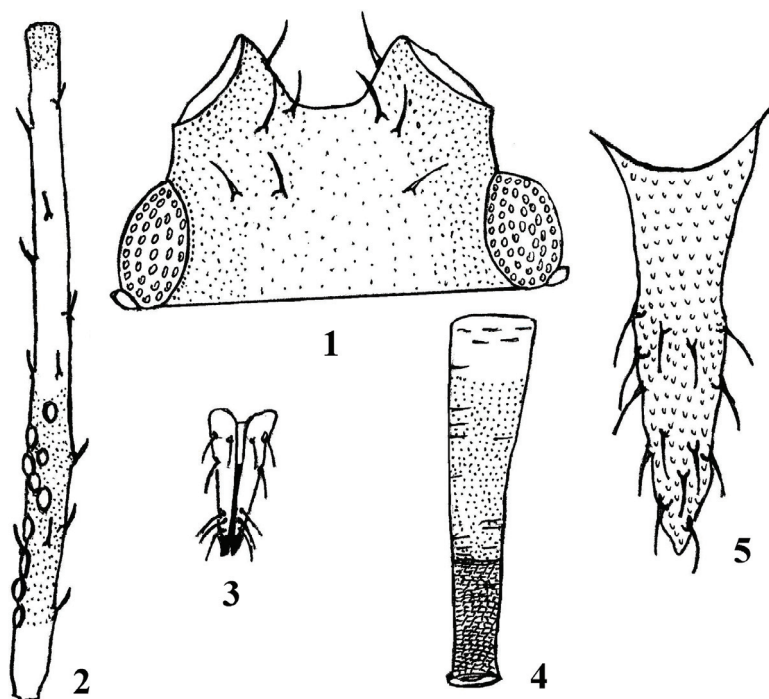
<http://zoobank.org/NomenclaturalActs/5D1DDC02-42EA-4867-8CA2-6D3F0CCD6D25>

Figs 1–5

TYPE MATERIAL. Holotype: apterous viviparous female, slide No 5066, **Kazakhstan**: South Kazakhstan region, West Tien Shan, Karzhantau Range, Kyrykkyz pass, h~1861 m, on *Pseudolinosyris grimii* (Rgl. et Schrenk) Novopokr., 11.VIII 2014, leg. R.Kh. Kadyrbekov. Paratypes: 21 apterous viviparous females together with holotype.

DESCRIPTION. **Apterous viviparous female** (by 22 specimens). Body oval, 2.29–2.88. Frontal groove is very deep with distinct antennal tubercles, 0.25–0.35 of the distance between bases of first antennal segments (Fig. 1). Frontal hairs (0.050–0.060) long, pointed, 1.3–1.5 of basal diameter of 3rd antennal segment. Antennae normal, six-segmented, 0.94–1.25 of body length. Third segment 1.25–1.55 of 4th one, 0.80–0.95 of 6th segment, 1.05–1.25 of the processus terminalis (Fig. 2). Processus terminalis 3.0–3.8 of the base of 6th segment. Secondary rhinaria in number 6–17 developed on the middle half of the 3rd segment (Fig. 2). Hairs on the 3rd segment (0.030–0.035) pointed, 0.75–0.85 of its basal diameter. Rostrum reaches before or behind of the hind coxae. Its ultimate rostral segment straight, not stiletto shaped (Fig. 3) 0.8–0.9 of the second segment of hind tarsus, 0.60–0.77 of the base of 6th segment with 6 accessory hairs. Siphunculi cylindrical with not distinct flanges, 0.14–0.18 of body length, 0.9–1.0 of cauda length (Fig. 4). Reticulated zone developed on the 0.25–0.35 of their length. Cauda finger-shaped with pointed apex, 2.3–2.9 of the second segment of hind tarsus with 10–17 hairs (Fig. 5). Second segment of hind tarsus 0.80–0.95 of the base of 6th antennal segment. Dorsal hairs (0.050–0.060) pointed 1.3–1.5 of the basal diameter of 3rd antennal segment. There are 10 hairs on 3rd tergite, 4 between siphunculi and 6–8 ones on the 8th tergite. Genital plate broad oval with 2 hairs on disk and 5–8 ones along its posterior margin. Legs normal developed. First tarsal segment with 3:3:3 hairs.

COLOR ON SLIDE. Head, clypeus, ultimate rostral segment, 1st, 2nd, middle and apex of 3rd, apex of 4th, 5–6th antennal segments, anal and genital plates, sclerites in base of dorsal hairs on 6–8th tergites are pale-brownish; apices of femora, tibiae (occasionally with light brownish middle parts), tarsi, siphunculi (except of base) are dark brownish. Cauda is pale. Antesiphuncular sclerites are absent.



Figs 1–5. *Macrosiphoniella aizhanae* Kadyrbekov, sp. n., apterous viviparous female. 1 – head; 2 – third antennal segment; 3 – ultimate rostral segment; 4 – siphunculus; 5 – cauda.

NATURAL COLORATION. Body is light green or light pink without slim, tibiae and siphunculi are dark brown.

MEASUREMENTS (holotype). Body 2.42; antennae 2.73–2.75: III 0.74, IV 0.51, V 0.43–0.44, VI 0.81–0.83 (0.19+0.62–0.64); siphunculi 0.39–0.40; cauda 0.41; ultimate rostral segment 0.14; second segment of hind tarsus 0.17.

HOST PLANT. *Pseudolinosyris grimii* (Rgl. et Schrenk) Novopokr. (Asteraceae).

BIONOMY. Aphids live on the stems of flowers.

DIAGNOSIS. The new species belongs to the group of species that lack ante-siphuncular sclerites. Among these species, by the depth of the frontal groove and the large size of the body, it is close to *M. tapuskae* (Hottes et Frison, 1931). *M. aizhanae* Kadyrbekov **sp. n.** differs from this species by shorter siphunculi ratio to the body length (0.14–0.18 compared to 0.25–0.38) and cauda length (0.9–1.0 vs. 1.8–2.3) and the proportion of the processus terminalis to the base of the 6th antennal segment (3.0–3.8 and 4.2–5.3).

DISTRIBUTION. Rock slopes of mountains.

ETYMOLOGY. The species is named after my wife, an entomologist and constant companion in expeditions.

***Macrosiphoniella* (s. str.) *scopariae deserticola* Kadyrbekov, subsp. n.**

<http://zoobank.org/NomenclaturalActs/13312DB6-F34B-4AC1-B48A-48821EC71759>

Figs 6–13

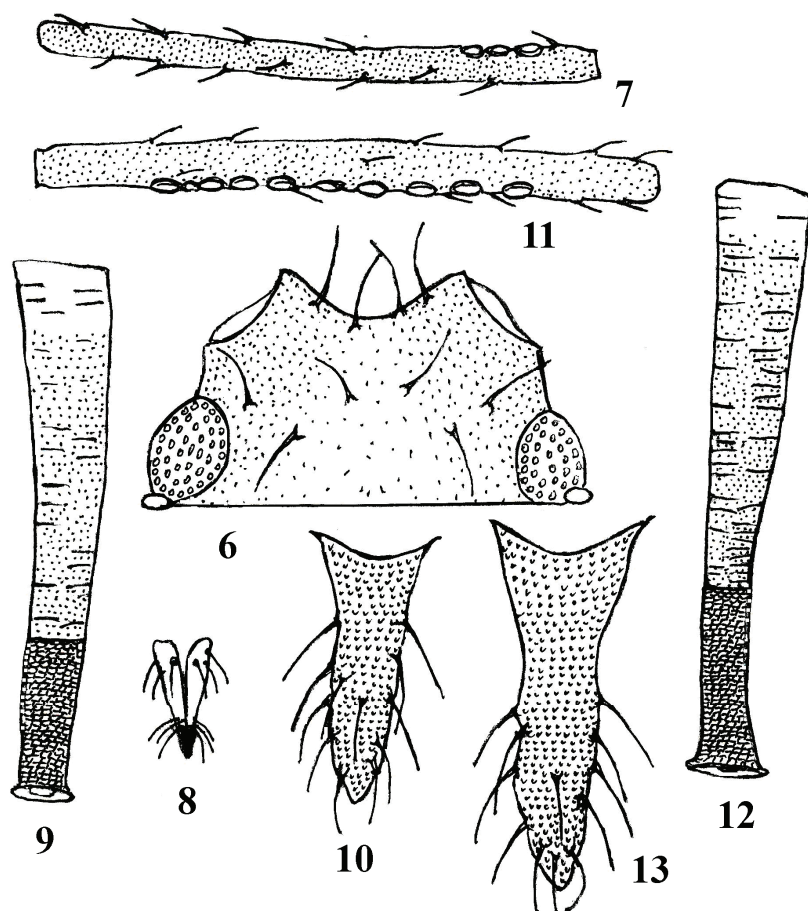
TYPE MATERIAL. Holotype: apterous viviparous female, slide No 1852, **South Kazakhstan**: Kyzylorda region, north shore of Aral Sea, 250 km NW of Aralsk Town, on *Artemisia tomentella* Trautv., 3.VI 1990, leg. R.Kh. Kadyrbekov. Paratypes: 3 alate viviparous females, 2 apterous viviparous females together with holotype; 1 alate viviparous female, 1 apterous viviparous female, No 1850, South Kazakhstan: Kyzylorda region, north shore of Aral Sea, 250 km NW of Aralsk Town, on *Artemisia tomentella* Trautv., 3.VI 1990, leg. R.Kh. Kadyrbekov; 3 fundatrix, slide No 4560, South-East Kazakhstan: Almaty region, Ile valley, 17 km SE of Zharkent Town, on *Artemisia scoparia* Waldst. et Kit., 5.V 2013, leg. Kh. Kadyrbekov.

DESCRIPTION. **Fundatrix** (by 3 specimens). Body is oval, 2.55–2.79, larger than apterous viviparous female. Frontal groove is lesser deep than apterous viviparous female, with distinct antennal tubercles, 0.25–0.30 of the distance between bases of first antennal segments. Frontal hairs (0.046–0.058) long, pointed, 1.5–1.7 to basal diameter of 3rd antennal segment. Antennae normal, six-segmented, are shorter than apterous viviparous female, 1.03–1.08 of body length. Third segment is 1.2–1.3 of 4th one, 0.65–0.68 of 6th segment, 0.80–0.89 of the processus terminalis. Processus terminalis is shorter than apterous viviparous female, 3.2–3.3 of the base of 6th segment. Secondary rhinaria in number 3–4 are developed on the base of the 3rd segment. Hairs on the 3rd segment (0.035) are pointed, equal to its basal diameter. Rostrum reaches before to the hind coxae. Its ultimate rostral segment slender, not stileto shaped, 0.77–0.81 of the second segment of hind tarsus, 0.59–0.62 of the base of 6th segment, with 4–6 accessory hairs. Siphunculi are cylindrical with distinct flanges, shorter than apterous viviparous female, 0.15–0.20 of body length, 1.23–1.37 of cauda length. Reticulated zone developed on the 0.22–0.26 of their length. Cauda is long conic with pointed apex and slow strap in base half, 2.0–2.4 of the second segment of hind tarsus, with 11–13 long pointed hairs. Second segment of hind tarsus is 0.77–0.81 of the base of 6th segment. Dorsal hairs (0.069) pointed, 2 times to the basal diameter of 3rd antennal segment. There are 18–20 hairs on 3rd tergite, 6–7 between siphunculi and 4–6 ones on the 8th tergite. Genital plate is broad oval with 2 hairs on disk and 6–8 ones along its posterior margin. Legs normal developed. First tarsal segment with 3:3:3 hairs.

COLOR ON SLIDE. Head, clypeus, 3rd–4th rostral segments, 1st–2nd, apex of 3rd, proximal half of 4th, 5–6th antennal segments, femora (except the base), base and apex of tibiae, tarsi, siphunculi, cauda are dark brownish; middle part of tibiae, anal and genital plates are pale-brownish. Anterior siphuncular sclerites are absent.

NATURAL COLORATION. Body is green with slim, head, antennae, legs, siphunculi, cauda are dark brown.

MEASUREMENT OF FUNDATRIX. Body 2.71; antennae 2.80–?: III 0.62–0.63, IV 0.50–0.52, V 0.47–0.48, VI 0.91–? (0.21+0.70–?); siphunculi 0.48–0.51; cauda 0.39; ultimate rostral segment 0.13; second segment of hind tarsus 0.17.



Figs 6–13. *Macrosiphoniella scopariae deserticola* Kadyrbekov, ssp. n. 6–10 – apterous viviparous female: 6 – head; 7 – third antennal segment; 8 – ultimate rostral segment; 9 – siphunculus; 10 – cauda; 11–13 – alate viviparous female: 11 – third antennal segment; 12 – siphunculus; 13 – cauda.

Apterous viviparous female (by 4 specimens including holotype). Body is elliptic, 2.29–2.40, lesser than fundatrix. Frontal groove is more deep than fundatrix, with distinct antennal tubercles, 0.30–0.35 of the distance between bases of first antennal segments (Fig. 6). Frontal hairs (0.058–0.069) long, pointed, 1.5–2.0 times to basal diameter of 3rd antennal segment. Antennae normal, six-segmented, are longer than fundatrix, 1.13–1.20 of body length. Third segment is 1.10–1.23 of 4th one, 0.63–0.70 of the 6th segment, 0.81–0.91 of the processus terminalis (Fig. 7). Processus terminalis is longer than fundatrix, 3.3–3.8 of the base of 6th segment. Secondary rhinaria in number 2–4 are developed on the base of the 3rd segment (Fig.

7). Hairs on the 3rd segment (0.035–0.046) are pointed, 1.5–2.0 times to its basal diameter. Rostrum reaches before up to the hind coxae. Its ultimate rostral segment slender not stiletto shaped (Fig. 8) 0.72–0.81 of the second segment of hind tarsus, 0.62–0.72 of the base of 6th segment, with 4–6 accessory hairs. Siphunculi are cylindrical with distinct flanges, longer than fundatrix, 0.20–0.22 of body length, 1.20–1.36 of cauda length (Fig. 9). Reticulated zone developed on the 0.20–0.28 of their length. Cauda is long conic with pointed apex and slow strap in base half, 2.2–2.5 of the second segment of hind tarsus, with 12–15 long pointed hairs (Fig. 10). Second segment of hind tarsus is 0.8–0.9 of the base of 6th segment. Dorsal hairs (0.069–0.075) pointed, 1.7–2.2 times to the basal diameter of 3rd antennal segment. There are 18–20 hairs on 3rd tergite, 6–7 between siphunculi and 4–6 ones on the 8th tergite. Genital plate is broad oval with 2 hairs on disk and 6–8 ones along its posterior margin. Legs normal developed. First tarsal segment with 3:3:3 hairs.

COLOR ON SLIDE. Head, clypeus, antennae, anal and genital plates are pale-brownish. Ultimate rostral segment, femora (except the base), tibiae (occasionally with light brownish middle parts), tarsi, siphunculi (except the base), cauda are dark brownish. Antesiphuncular sclerites are absent.

NATURAL COLORATION. Body is green with slim, head, legs, siphunculi, cauda are dark brown.

MEASUREMENT OF HOLOTYPE. Body 2.32; antennae 2.61–2.66: III 0.59, IV 0.48, V 0.45–0.47, VI 0.85–0.88 (0.20+0.65–0.68); siphunculi 0.46–0.48; cauda 0.37; ultimate rostral segment 0.13; second segment of hind tarsus 0.16.

Alate viviparous female (by 4 specimens). Body is elliptic, 2.49–3.19, more than apterous viviparous female. Frontal groove is more deep, with distinct antennal tubercles, 0.30–0.35 of the distance between bases of first antennal segments. Frontal hairs (0.035–0.058) pointed, lesser than apterous viviparous female, 1.0–1.5 times to the basal diameter of 3rd antennal segment. Antennae normal, six-segmented, 1.12–1.24 of body length. Third segment is 1.20–1.32 of 4th one, 0.70–0.75 of the 6th segment, 0.91–0.99 of the processus terminalis. Processus terminalis is longer than fundatrix and apterous viviparous female, 3.5–4.0 times to the base of 6th segment. Secondary rhinaria in number 8–15 are developed on the all length of the 3rd segment (Fig. 11). Hairs on the 3rd segment (0.029–0.040) are shorter than apterous viviparous female, pointed, 0.8–1.0 times to its basal diameter. Rostrum reaches before up to the hind coxae. Its ultimate rostral segment slender, not stiletto shaped, 0.72–0.73 of the second segment of hind tarsus, 0.58–0.65 of the base of 6th segment, with 4–6 accessory hairs. Siphunculi are cylindrical with distinct flanges, 0.16–0.22 of body length, 1.2–1.6 times to cauda length (Fig. 12). Reticulated zone developed on the 0.20–0.30 of their length. Cauda is long conic with pointed apex and strap in base half, 2.0–2.3 of the second segment of hind tarsus, with 10–12 long pointed hairs (Fig. 13). Second segment of hind tarsus is 0.78–0.90 of the base of 6th segment. Dorsal hairs (0.046–0.069) pointed, 1.3–1.7 times to the basal diameter of 3rd antennal segment. There are 18–20 hairs on 3rd tergite, 6–7 between siphunculi and 4–6 ones on the 8th tergite. Genital plate is broad oval with 2 hairs on disk and 6–8 ones along its posterior margin. Legs normal developed. First tarsal segment with 3:3:3 hairs.

COLOR ON SLIDE. Head, antennae, clypeus, rostrum, thorax, femora (except the base), coxae, tibiae, tarsi, siphunculi, cauda are dark brownish; trochanters, anal and genital plates are pale-brownish. Anterior siphuncular and other sclerites are absent.

NATURAL COLORATION. Body is green with slim, head, thorax, legs, siphunculi, cauda are dark brown.

MEASUREMENT OF ALLOTYPE. Body 2.99; antennae 3.34–?: III 0.79–0.83, IV 0.66, V 0.62–0.63, VI 1.03–? (0.23+0.80–?); siphunculi 0.56–0.58; cauda 0.40; ultimate rostral segment 0.13; second segment of hind tarsus 0.18.

HOST PLANT. *Artemisia (Oligosporus) arenaria* DC., *A. (O.) scoparia* Waldst. et Kit., *A. (O.) tomentella* Trautv. (Asteraceae).

BIONOMY. Aphids live on the stems to the flowers.

DIAGNOSIS. The new subspecies is basically similar to the nominative. *M. scopariae deserticola* Kadyrbekov, ssp. n. differs from *M. scopariae scopariae* Bozhko, 1959 by the absence of anterior siphuncular and other sclerites on the abdomen in all seasonal morphs, lighter coloring of the head, antennae and legs in wingless viviparous females, somewhat lower ratio of siphunculi to body length in apterous viviparous females (0.20–0.22 against 0.23–0.25) and, on average, somewhat more hairs on the cauda (12–15 compared to 10–11).

DISTRIBUTION. Sandy deserts of South Kazakhstan.

***Macrosiphoniella* (s. str.) *altaica* Ivanovskaja, 1971**

Macrosiphoniella (s. str.) *altaica* Ivanovskaja, 1971: 6, fig. 2 (holotype – apterous viviparous female, Russia: Russian Altai, Bolshoy Jaloman, 10.VII 1963, leg. Ivanovskaja; in the Biological Institute, SO RAN, Novosibirsk).

Macrosiphoniella (s. str.) *longirostrata* Holman et Szelegiewicz, 1974: 171, fig. 2A (holotype – apterous viviparous female, Mongolia: 40 km N. of Sain Sand, 24.VII 1963, leg. H. Szelegiewicz; in the Zoological Institute in Warsaw, Poland); **syn. n.**

NOTES. When comparing *M. altaica* and *M. longirostrata* (Table 1) according to the values of the main morphological characters, there is no noticeable difference between these taxa. In addition, they live on the same host plant *Artemisia frigida* and species was described from adjacent territories (Russian Altai and Mongolia). In our opinion *M. longirostrata* is a junior synonym of *M. altaica*.

***Macrosiphoniella khinganica* Pashtshenko, 1998, stat. n.**

Macrosiphoniella pulvera khinganica Pashtshenko, 1998: 1369, , figs 1(6-10) (holotype – apterous viviparous female, Russia: Amur region, Kundur village, Khingan reserve, 20.VII 1988, leg. Pashtshenko; in Federal Scientific Center of the East Asia Terrestrial Biodiversity DVO RAN, Vladivostok).

NOTES. This taxon has been described as a subspecies of *M. pulvera* (Walker, 1948) (Pashtshenko, 1998). However, a comparison of former with *M. pulvera* (Table 1) showed the presence of a number of differences between them in the ratio of the siphunculi to the body (0.10–0.11 vs. 0.13–0.17) and the cauda (0.7–0.8 compared to 0.80–0.95), the ultimate rostral segment and the second segment of the

hind tarsus (1.0–1.1 and 0.85–0.95), the processus terminalis to the base of the 6th antennal segment (2.5–2.9 against 3.0–3.5). I supposed that based on the above differences *M. khinganica* deserves the species status.

Table 1. Values of morphological features of some taxa of *Macrosiphoniella*

Characters	<i>M. altaica</i>	<i>M. longirostrata</i>	<i>M. pulvera pulvera</i>	<i>M. pulvera khinganica</i>
Siphunculi/Body	0.23	0.15–0.22	0.13–0.17	0.10–0.11
Siphunculi/cauda	1.1–1.2	1.1–1.4	0.80–0.95	0.7–0.8
Reticulated zone	0.45–0.50	0.45–0.50	0.45–0.55	0.51–0.60
Ultimate rostral segment/ 2nd segment of hind tarsus	1.4–1.5	1.30–1.5	0.85–0.95	1.0–1.1
Number of hairs on ultimate rostral segment	6+6	6+6	6+6	6+6
Processus terminalis/ base of 6th antennal segment	3.5	3.2–3.5	3.0–3.5	2.5–2.9
Length of hairs on 3rd antennal segment/ its basal diameter	1.5	1.3	0.7–1.0	?
Number of secondary rhinaria on 3rd antennal segment	5–6	2–6	2–7	2–3
Number of hairs on cauda	10	9–12	14–20	15–17

***Macrosiphoniella aktashica aktashica* (Nevsky, 1928)**

Macrosiphum aktashicum aktashicum Nevsky, 1928: 182 (holotype – apterous viviparous female, Kazakhstan: Karjantau range, Aktash, in the Zoological institute RAN, St. Petersburg).

Macrosiphum aktashicum hirsutum Danijarova, 1979: 389, fig. 1 (holotype – apterous viviparous female, Tajikistan: Hissar Range, Kondara, 22.VII 1977; in the Institute Zoology and Parasitology AN Tajikistan, Dushanbe); **syn. n.**

NOTES. It should be noted that, according to the morphological features given in Table 2, we see no difference between *M. aktashica aktashica* (Nevsky, 1928) and *M. aktashica hirsuta* (Danijarova, 1979). Thus, *M. aktashica hirsuta* (Danijarova, 1979) is synonymized here with *M. aktashica aktashica* (Nevsky, 1928).

***Macrosiphoniella aktashica tapuskae* (Hottes et Frison, 1931), stat. n.**

Macrosiphum tapuskae Hottes et Frison, 1931: 327 (holotype – apterous viviparous female, USA: Illinois, in the collection of Natural History Survey, Urbana, Illinois).

NOTES. The difference between *Macrosiphoniella tapuskae* (Hottes et Frison, 1931) and *M. aktashica* (Nevsky, 1928) is small, but stable, noticeable in the ratio of the 4th and 3rd segments of the antennae, siphunculi and cauda, the number of hairs on the cauda (Table 2). We believe that these differences allow us to consider these species as subspecies of one species.

Table 2. Values of morphological traits in the species complex *Macrosiphoniella aktashica*

Characters	<i>M. aktashica tapuskae</i>	<i>M. aktashica aktashica</i>	<i>M. aktashica hirsuta</i>
Siphunculi/ Body	0.25–0.38	0.30–0.32	0.30–0.32
Siphunculi/ Cauda	1.8–2.3	2.3–2.6	2.0–2.5
Ultimate rostral segment/ 2nd segment of hind tarsus	1.0–1.1	1.0–1.1	?
4th/3rd antennal segment	0.7–0.9	0.97–1.10	0.85–1.0
Processus terminalis/ base of 6th antennal segment	4.2–5.3	4.0–5.5	4.5–4.7
Number of secondary rhinaria on 3rd antennal segment of alate viviparous females	28–70	?	33–40
Number of secondary rhinaria on 3rd antennal segment of apterous viviparous females	6–23	7–8	7–8
Number of hairs on cauda	8–16	6–8	6–8

Key to the light green and green Palearctic species from the nominative subgenus *Macrosiphoniella* without dark abdominal sclerites

- 1(44) Siphunculi are equal or longer than the cauda.
- 2(5) Reticulated zone of siphunculi is 0.12–0.20 of their length.
- 3(4) Forth antennal segment 0.7–0.9 of 3rd antennal segment length. Siphunculi 1.8–2.3 of cauda length. Cauda with 8–16 hairs. On the *Achillea millefolium*, *Matricaria inodora*, *Tanacetum* spp. Holarctic ***M. aktashica tapuskae* (Hottes et Frison, 1931)**
- 4(3) Forth antennal segment 0.95–1.10 of 3rd antennal segment length. Siphunculi 2.0–2.6 of cauda length. Cauda with 6–8 hairs. On the *Tanacetum* spp., *Achillea* spp. Kazakhstan (south), Uzbekistan, Tajikistan, Afghanistan ***M. aktashica aktashica* (Nevsky, 1928)**
- 5(2) Reticulated zone of siphunculi is not lesser 0.25 of their length.
- 6(9) Frontal groove is almost straight, frontal tubercles absent.
- 7(8) Ultimate rostral segment 1.2–1.5 times to the second segment of hind tarsus. Reticulated zone of siphunculi is 0.35–0.45 of their length. Tibiae pale to the middle as body color. On the *Artemisia globella*, *A. sp.* Kazakhstan, Mongolia ***M. cedmidi* Szelegiewicz, 1963**
- 8(7) Ultimate rostral segment 1.0–1.2 of the second segment of hind tarsus. Reticulated zone of siphunculi is 0.5–0.6 of their length. Tibiae are dark brown. On the *Artemisia princeps*, *A. pectinata*. Central and Eastern Kazakhstan, Russia (Far East), Korea. ***M. taesongsanensis* Szelegiewicz, 1980**
- 9(6) Frontal groove is distinct, frontal tubercles are visible.
- 10(23) Reticulated zone of siphunculi is 0.25–0.40 of their length.
- 11(12) Siphunculi 0.25–0.28 of the body length and 1.8–2.1 times of the cauda length. Processus terminalis 5.0–5.5 times the base of 6th antennal segment. On the *Leucanthemum* spp. South Europe ***M. leucanthemi* (Ferrari, 1872)**

- 12(11) Siphunculi not more 0.25 of the body length and not more 1.7 time of the cauda length.
- 13(16) Siphunculi 1.5–1.7 times of the cauda length.
- 14(15) Third antennal segment is shorter of the forth antennal segment. Cauda with more than 20 hairs. On the *Artemisia dracunculus*. Kyrgyzstan ***M. dracunculi* Umarov, 1964**
- 15(14) Third antennal segment is always longer of the forth antennal segment. Cauda with 8–12 hairs. On the *Artemisia dracunculus*, *A. scoparia*. South Kazakhstan ***M. alatavica* (Nevsky, 1928)**
- 16(13) Siphunculi are 1.0–1.3 of the cauda length.
- 17(18) Processus terminalis 1.8–2.2 times the base of 6th antennal segment. Cauda with 14–20 hairs. Tibiae pale to middle as body color. On the *Karelinia caspia*. Kazakhstan, China (Xinjiang) ***M. kareliniae* Kadyrbekov, Renxin et Shao, 2002**
- 18(17) Processus terminalis 2.1–3.2 times the base of 6th antennal segment. Cauda with 20–30 hairs. Tibiae and cauda are dark brown.
- 19(22) Third antennal segment 0.9–1.0 times the 6th antennal segment. Siphunculi are 1.2–1.3 of the cauda length. Reticulated zone of siphunculi is 0.30–0.35 of their length.
- 20(21) Third antennal segment with 3–5 secondary rhinaria. Siphunculi 0.15–0.20 of body length. Cauda with 20–30 hairs. On the *Artemisia (Seriphidium)* spp. Russia (Lower Volga), Kazakhstan, Kyrgyzstan, China (Xinjiang) ***M. kirgisica* Umarov, 1964**
- 21(20) Third antennal segment with 34–38 secondary rhinaria. Siphunculi 0.24 of body length. Cauda with 17–19 hairs. On the *Artemisia* sp. China (Xinjiang) ***M. huochengensis* Zhang, Chen et Zhong, 1999**
- 22(19) Third antennal segment is 1.1–1.3 times of the 6th antennal segment. Siphunculi are 1.0–1.1 of the cauda length. Reticulated zone of siphunculi is 0.20–0.26 of their length. Cauda with 18–21 hairs. On the *Lepidolopha filifolia*. South Kazakhstan (Karatau ridge) ***M. karatavica* Kadyrbekov, 2015**
- 23(10) Reticulated zone of siphunculi is not lesser 0.45 of their length.
- 24(31) Third antennal segment with not lesser than 8 secondary rhinaria.
- 25(26) Third antennal segment with 23–73 secondary rhinaria. Processus terminalis 3.5–4.8 times the base of 6th antennal segment. On the *Artemisia arctica*, *A. tanacetifolia*, *Tanacetum boreale*. Eastern Kazakhstan, Russia (Eastern Siberia, Chukotka) ***M. borealis* Pashtshenko, 1998**
- 26(25) Third antennal segment with not more 20 secondary rhinaria. Processus terminalis 2.5–3.3 times the base of 6th antennal segment.
- 27(30) Frontal groove deeps, antennal tubercles high. Siphunculi 1.04–1.10 times the cauda length.
- 28(29) Third antennal segment with 12–18 secondary rhinaria. Processus terminalis 2.7–3.3 times the base of 6th antennal segment. Siphunculi 0.16–0.18 of body length. Cauda with 23–29 hairs. On the *Artemisia vulgaris*, *A. sp.* India ***M. kalimpongensis* Basu et Raychaudhuri, 1976**
- 29(28) Third antennal segment with 10 secondary rhinaria. Processus terminalis 2.5–2.6 times the base of 6th antennal segment. Siphunculi 0.20–0.21 of body length. Cauda with 14–18 hairs. On the *Artemisia* sp. China ***M. huaidensis* Zhang, 1980**
- 30(27) Frontal groove and antennal tubercles are low. Siphunculi 1.2–1.4 times the cauda length. Cauda pale, with 12–15 hairs. Tibiae of hind legs pale with dark apices. On the *Artemisia (Seriphidium)* spp. Hungary, Israel, Kazakhstan ***M. szalaymarzsoi* Szelegiewicz, 1978**
- 31(24) Third antennal segment with not more than 7 secondary rhinaria.

- 32(33) Ultimate rostral segment is 0.67–0.87 of second segment of hind tarsus. On the *Artemisia (Oligosporus)* spp. Southern Kazakhstan ***M. scopariae deserticola* Kadyrbekov, sp. n.**
- 33(32) Ultimate rostral segment equal or longer of second segment of hind tarsus.
- 34(35) Siphunculi not lesser 0.25 of the body length and more than 1.55 times the cauda length. Reticulated zone of siphunculi 0.50–0.55 of their length. Processus terminalis 0.8–0.9 of 3rd antennal segment and 2.8–3.2 times the base of 6th antennal segment. Tibiae are dark brown. On the *Artemisia* sp. Tajikistan ***M. lidiae* Umarov, 1966**
- 35(34) Siphunculi not more 0.23 of the body length and not more than 1.5 times the cauda length.
- 36(43) Ultimate rostral segment is 1.0–1.2 of the second segment of hind tarsus.
- 37(42) Depth of frontal groove is 0.15–0.19 of the distance between apices of the antennal tubercles. Tibiae of middle and hind legs are dark brown, sometimes pale brown in the middle. Processus terminalis is longer or equal to the 3rd antennal segment in norm.
- 38(39) Siphunculi are 1.0–1.2 of the cauda length. Cauda is brown as siphunculi with 12–19 hairs. On the *Artemisia terrae-alba*, *A. sublessingiana*. Southern, Central, Eastern Kazakhstan ***M. terraealbae* Kadyrbekov, 2000**
- 39(38) Siphunculi not lesser 1.4 of the cauda length. Cauda with 7–10 hairs.
- 40(41) Third antennal segment with 3–5 secondary rhinaria. Processus terminalis 3.0–3.5 of the base of 6th antennal segment. Ultimate rostral segment with 6 accessory hairs. Siphunculi 1.40–1.45 of the cauda length. On the *Artemisia ferganensis*. Tajikistan ***M. tadzhicana* Narzikulov, 1958**
- 41(40) Third antennal segment with 2–3 secondary rhinaria. Processus terminalis 1.70–1.75 of the base of 6th antennal segment. Ultimate rostral segment with 8 accessory hairs. Siphunculi 1.50–1.55 of the cauda length. On the *Artemisia scoparia*. India ***M. lambersi* Verma, 1971**
- 42(37) Depth of frontal groove is 0.21–0.25 of the distance between apices of the antennal tubercles. Tibiae of middle and hind legs pale as body color, except darkish bases and apices. Processus terminalis is shorter or equal to the 3rd antennal segment in norm. On the *Artemisia (Seriphidium)* spp. Russia (Lower Volga), Kazakhstan, Tajikistan, China (Xinjiang) ***M. seriphidii* Kadyrbekov, 2000**
- 43(36) Ultimate rostral segment is 1.30–1.45 of the second segment of hind tarsus. On the *Artemisia frigida*, *A. austriaca*. Kazakhstan, Russia (Russian Altai), Mongolia ***M. altaica* Ivanovskaja, 1971**
- 44(1) Siphunculi are equal or shorter than the cauda.
- 42(53) Ultimate rostral segment is equal or longer than the second segment of hind tarsus.
- 43(48) Frontal groove is visible with distinct antennal tubercles.
- 44(45) Ultimate rostral segment is 1.3–1.6 times the second segment of hind tarsus with 8–9 accessory hairs. Cauda with 8–10 hairs. Tibiae pale with dark apices. On the *Artemisia stelleriana*. Russia (Sakhalin) ***M. sachalinensis* Pashtshenko, 1998**
- 45(44) Ultimate rostral segment is not more 1.25 times the second segment of hind tarsus with 6 accessory hairs. Cauda with 20–30 hairs. Tibiae are dark brown or blackish.
- 46(47) Frontal groove is very deep, 0.30 of the distance between apices of the antennal tubercles. Processus terminalis is 3.4–3.7 times the base of 6th antennal segment. Siphunculi are 0.15–0.16 of the body length. Reticulated zone of siphunculi 0.3–0.4 of their length. On the *Artemisia stolonifera*. Russia (Far East) ***M. sichotealiensis* Pashtshenko, 1998**
- 47(46) Frontal groove is 0.15–0.18 of the distance between apices of the antennal tubercles. Processus terminalis is 2.3–3.1 times the base of 6th antennal segment. Siphunculi are 0.10–0.13 of the body length. Reticulated zone of siphunculi 0.5–0.7 of their length. On the *Artemisia vulgaris*, *A. mongolica*, *A. princeps*, *A.* spp. Russia (Far East), Korea, China, Japan, South-East Asia, India ***M. yomogifoliae* (Shinji, 1924)**

- 48(43) Frontal groove is almost straight, frontal tubercles absent.
- 49(50) Ultimate rostral segment is 1.2–1.5 times the second segment of hind tarsus. Reticulated zone of siphunculi 0.35–0.45 of their length. On the *Artemisia globella* and *Artemisia* sp. Kazakhstan, Mongolia ***M. cedmidi* Szelegiewicz, 1963**
- 50(49) Ultimate rostral segment is 1.0–1.2 of the second segment of hind tarsus. Reticulated zone of siphunculi 0.5–0.6 of their length.
- 51(52) Siphunculi are 0.10–0.12 of body length. Cauda with 15–17 hairs. Tibiae are pale as body color with dark apices. On the *Artemisia mongolica*. Russia (Far East) ***M. khinganica* Pashtshenko, 1998**
- 52(51) Siphunculi are 0.14–0.17 of body length. Cauda with 9–12 hairs. Tibiae are dark brown. Kazakhstan, Korea, Russia (Far East) ***M. taesongsanensis* Szelegiewicz, 1980**
- 53(42) Ultimate rostral segment is always shorter than the second segment of hind tarsus.
- 54(67) Tibiae are dark brown or blackish, rear pale brown to middle, but not as body color.
- 55(56) Third antennal segment is always shorter than 4th antennal segment. On the *Artemisia sieversiana*, *A.* sp. Northern and Eastern Kazakhstan, Russia (West Siberia) ***M. sibirica* Ivanovskaja, 1971**
- 56(55) Third antennal segment is always longer than 4th antennal segment.
- 57(60) Cauda with 22–35 hairs.
- 58(59) Third antennal segment with 8–34 secondary rhinaria. Processus terminalis is 3.8–4.2 times the base of the 6th antennal segment. Reticulated zone of siphunculi is 0.35–0.45 of their length. On the *Achillea ptarmica*. Europe ***M. ptarmicae* Hille Ris Lambers, 1956**
- 59(58) Third antennal segment with 12–45 secondary rhinaria. Processus terminalis is 2.9–3.5 times the base of the 6th antennal segment. Reticulated zone of siphunculi is 0.45–0.55 of their length. On the *Achillea*, *Tanacetum*, *Matricaria*. Holarctic ***M. tanacetaria* (Kaltenbach, 1843)**
- 60(57) Cauda with not more 20 hairs.
- 61(64) Third antennal segment with 6–17 secondary rhinaria.
- 62(63) Third antennal segment is shorter or equal of the processus terminalis. Hairs of 3rd antennal segment 1.5 times its basal diameter. Reticulated zone of siphunculi is 0.50–0.60 of their length. Cauda with 14–20 hairs. On the *Artemisia sieversiana*. East and South East Kazakhstan, Mongolia ***M. sieversianae* Holman et Szelegiewicz, 1974**
- 63(62) Third antennal segment is 1.05–1.20 of the processus terminalis. Hairs of 3rd antennal segment 0.75–0.85 of its basal diameter. Reticulated zone of siphunculi is 0.25–0.40 of their length. Cauda with 10–17 hairs. On the *Pseudolinosyris grimii*. Southern Kazakhstan ***M. aizhaniae* Kadyrbekov, sp. n.**
- 64(61) Third antennal segment with 2–7 secondary rhinaria.
- 65(66) Processus terminalis is 2.7–3.2 times the base of the 6th antennal segment. Siphunculi 0.13–0.17 of body length. Cauda with 14–20 hairs. On the *Artemisia maritima*, *A.* spp. Palearctic ***M. pulvera* (Walker, 1848)**
- 66(65) Processus terminalis is 3.30–3.55 times the base of the 6th antennal segment. Siphunculi 0.08 of body length. Cauda with 10–13 hairs. On the *Artemisia scoparia*. China (Gansu) ***M. tszhongi* Zhang, Chen et Zhong, 1999**
- 67(54) Tibiae are pale as body color with darkish apices.
- 63(64) Processus terminalis is 3.7–4.5 times the 3rd antennal segment. Siphunculi are darkish to the apices only. On the *Artemisia procera*, *A. proceraeformis*. Ukraine, Kazakhstan ***M. procerae* Bozhko, 1953**
- 64(63) Processus terminalis is not more 3.7 times the base of the 6th antennal segment. Siphunculi are darkish to the apical half.
- 65(68) Siphunculi 0.13–0.17 of body length.

- 66(67) Depth of frontal groove is 0.17–0.19 of the distance between apices of the antennal tubercles. Siphunculi 0.80–0.95 of cauda length. Cauda with 14–20 hairs. On the *Artemisia maritima*, *A. (Seriphidium)* spp. Palearctic ***M. pulvera* (Walker, 1848)**
- 67(66) Depth of frontal groove is 0.23–0.25 of the distance between apices of the antennal tubercles. Siphunculi 0.70–0.75 of cauda length. Cauda with 23–30 hairs. On the *Artemisia argyi*. China (Gansu) ***M. jinghualii* Zhang, Chen et Zhong, 1999**
- 66(65) Siphunculi 0.10–0.13 of body length. On the *Artemisia* from nominative subgenus.
- 67(68) Cauda with 15–25 hairs. Hairs of 3rd antennal segment is 1.1–1.8 times its basal diameter. On the *Artemisia abrotani*, *A. absinthium*, *A. vulgaris*, *Matricaria inodora*. West Palearctic ***M. abrotani abrotani* (Walker, 1852)**
- 68(65) Siphunculi 0.10–0.13 of body length. On the *Artemisia* from nominative subgenus.
- 69(70) Cauda with 15–25 hairs. Hairs of 3rd antennal segment is 1.1–1.8 times its basal diameter. On the *Artemisia abrotani*, *A. absinthium*, *A. vulgaris*, *Matricaria inodora*. West Palearctic ***M. abrotani abrotani* (Walker, 1852)**
- 70(69) Cauda with 10–17 hairs. Hairs of 3rd antennal segment is 0.8–1.0 times its basal diameter.
- 71(74) Third antennal segment with 4–8 secondary rhinaria.
- 72(73) Processus terminalis is 3.2–3.6 times the base of the 6th antennal segment and 1.2–1.3 of 3rd antennal segment. On the *Artemisia messerschmidtiana*, *A. annua*, *A. montana*, *Tanacetum boreale*. Russia (Far East), Korea ***M. abrotani chosoni* Szelegiewicz, 1980**
- 73(72) Processus terminalis is 2.1 times the base of the 6th antennal segment and 0.95–1.02 of 3rd antennal segment. On the *Artemisia scopariae*. China (Gansu) ***M. abrotani hofuchui* Zhang, Chen et Zhong, 1999. stat. n.**
- 74(71) Third antennal segment with 2–5 secondary rhinaria. Processus terminalis is 3.0–3.3 times the base of the 6th antennal segment. On the *Artemisia vulgaris*, *A. sp.* Kazakhstan (south east, east), Mongolia ***M. abrotani sainshandi* Szelegiewicz, 1963**

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